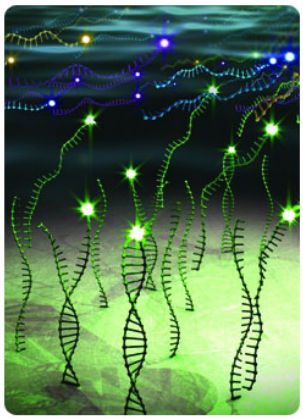
LIVERMORE LAB
REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Aug. 5-9, 2013.

Innovation IT DOESN'T GET ANY FASTER THAN THIS



The Lawrence Livermore Microbial Detection Array features aggregates of probes arranged in a square grid. Several dozen squares on the grid contain probes that correspond to unique genetic sequences from a single organism. Rendering by Sabrina Fletcher/ LLNL)

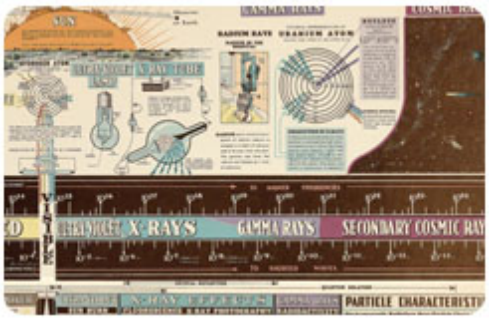
Speedy, accurate identification of the viruses, bacteria and fungi that cause disease is becoming increasingly important.

While several techniques exist for identifying pathogens via their genetic code, most of these methods are too costly or slow to efficiently analyze clinical and environmental samples that may contain hundreds or even thousands of different microbes.

Lawrence Livermore researchers have developed a technology that rapidly identifies any known microbe whose genetic code has been sequenced. Called the Lawrence Livermore Microbial Detection Array (LLMDA), the technology combines innovative bioinformatics (the discipline of analyzing biological data using computational tools) with a tiny device called a microarray.

To read more, go to *Innovation*.

GEEK AN INFOGRAPHIC LIKE NO OTHER



This unearthed electromagnetic wave poster could be classified as an infographic.

At some point in the last few decades, someone took a poster and stuffed it in an unused office at Lawrence Livermore National Lab. The poster was made by the W.M Welch Scientific Company in 1944, and it depicts in breathtaking detail how electromagnetic waves work.

When it was uncovered a while back, the folks at Livermore decided to hang it in a hallway, rather than hide it away for a few more decades. The LLNL Flickr account now has a super-high resolution scan of the poster -- all 10,000 x 6958 pixels of it.

Up at the top is the electromagnetic spectrum diagram from all those science textbooks, but here it's highly detailed and has sketches of examples of each kind of radiation above it. Below the main spectrum diagram, the poster goes into the specifics on a number of topics. This is basically an infographic before anyone knew what an infographic was.

To read more, go to Geek.

SIGNAL ONLINE PERSISTENCE PAYS OFF

Lawrence Livermore researchers are prepared to hand the Defense Department a prototype system that compresses imagery without losing the quality of vital data. The system reduces the volume of information; allows imagery to be transmitted long distances, even across faulty communications links; and allows the data to be analyzed more efficiently and effectively.

The Persistics computational system developed at Lawrence Livermore derives its name from the combination of two words: persistent surveillance. The system is designed to revolutionize the collection, communication and analysis of intelligence, surveillance and reconnaissance (ISR) data so that warfighters do not find themselves drowning in a swamp of too much information.

The ground-based system has demonstrated 1,000 times compression of raw wide-area video collections from manned and unmanned aircraft and a tenfold reduction of pre-processed images. Standard video compression can achieve only a 30-times data reduction.

To read more, go to *Signal*.

Bloomberg IT'S NO ONE FAULT

A worker checks the valve of a gas pipe at a natural gas plant in Suining, in southwest Sichuan province, an area where oil companies are drilling for gas and oil. Image: AFP/Getty Images

China won't let earthquakes hinder its quest for energy.

Companies such as Royal Dutch Shell Plc and China National Petroleum Corp. are starting to drill for gas and oil in shale rock in Sichuan, the nation's most seismically active province, a process geologists say raises the risk of triggering quakes.

Sichuan lies at the crossroads of some of the earth's most active fault lines.

"The Sichuan basin is at the edge of the biggest continental collision in the world, India smashing into Asia," said Julio Friedmann, chief energy technologist at Lawrence Livermore. "That's stressing the continental crust."

To read more, go to *Bloomberg*.

POWER HERE COMES THE SUN

Solar power saw a huge energy gain from 2011 to 2012, according to the most recent U.S. energy flow charts released by the Lawrence Livermore.

More people used solar panels to heat and cool their homes and businesses in 2012 than in previous years.

An increasing amount of the energy used each year in the United States is coming from renewable sources such as solar panels and wind turbines, according to new research released by Lawrence Livermore National Laboratory.

From 2011 to 2012, solar energy production increased by 49 percent and wind energy increased by 16 percent.

Coal use decreased for power generation and industrial use while natural gas consumption increased considerably.

To read more, go to *Power Magazine*.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance. To send input to the *Livermore Lab Report*, send e-mail